Georgia Department of Transportation

Transportation Products Qualified Products List (QPL)

Standard Operating Procedure 42

Product Evaluation Process for Traffic Signal and Intelligent Transportation System Components



Georgia Department of Transportation 935 United Avenue, Building 24 Atlanta, GA 30316

> Revised: November 6, 2020 Version 1.1

State Traffic Engineer
State Materials Engineer
Director of Construction

REVISION HISTORY

Section No	Effective Date	Description
Cover	1-2021 (Anticipated)	Internal review draft v1.1 Section
1	1-2021 (Anticipated)	Internal review draft v1.1 Section
I	1-2021 (Anticipated)	Internal review draft v1.1 Section
2	1-2021 (Anticipated)	Internal review draft v1.1 Section
3	1-2021 (Anticipated)	Internal review draft v1.1 Section
4	1-2021 (Anticipated)	Internal review draft v1.1 Section
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5	1-2021 (Anticipated)	Internal review draft v1.1 Section
6	1-2021 (Anticipated)	Internal review draft v1.1 Section
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7	1-2021 (Anticipated)	Internal review draft v1.1 Section
8	1-2021 (Anticipated)	Internal review draft v1.1 Section
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9	1-2021 (Anticipated)	Internal review draft v1.1 Section
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Appendix A	1-2021 (Anticipated)	Internal review draft v1.1 Section
Appendix B	1-2021 (Anticipated)	Internal review draft v1.1 Section

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1. Purpose

The Georgia Department of Transportation (GDOT) Product Evaluation Program provides a well-defined and organized system for considering a variety of products for use on Georgia roadway facilities.

This standard operating procedure (SOP) provides a process to evaluate and approve products for use within the GDOT traffic signal and intelligent transportation system (ITS) networks and governs Qualified Products List (QPL) 48 – Traffic Signal & ITS Equipment.

QPL 48 identifies products that are approved for use on GDOT projects. Products on QPL 48 have been evaluated and approved as meeting or exceeding the appropriate equipment specification based on the following sections of the GDOT Standard Specifications:

- 631 Dynamic Message Signs
- 694 Weather Monitoring and Reporting System
- 925 Traffic Control Signal Equipment
- 926 Wireless Communications Equipment
- 935 Fiber Optic System
- 936 Closed Circuit Television (CCTV)
- 937 Detection Systems
- 939 Communications and Electronic Equipment

Participation in the Product Evaluation Program is required for vendors/suppliers (the Applicant) who seek to supply their products for use in GDOT construction and maintenance projects. To be eligible for acquisition and installation during a construction project, the product shall be listed on the GDOT QPL 48.

2. Scope

GDOT has two processes for product evaluation depending on the type of request (Figure 1). The first process is for products that are currently governed by GDOT Standard Specifications and are listed on QPL 48. As specifications are periodically updated, these products are evaluated in accordance with this procedure.

The second process is for new products where there are no existing GDOT specifications. These products include new technologies or new applications of existing technologies that fulfill a need and demonstrate value toward GDOT achieving its mission. New products are evaluated in accordance with the New Products Evaluation (NPE) Guidelines located at the websites listed on Figure 1 and are not discussed further in this procedure.

The GDOT Office of Traffic Operations (OTO) will evaluate only those products that fully meet the requirements as documented in this SOP and are covered by current Standard Specifications.

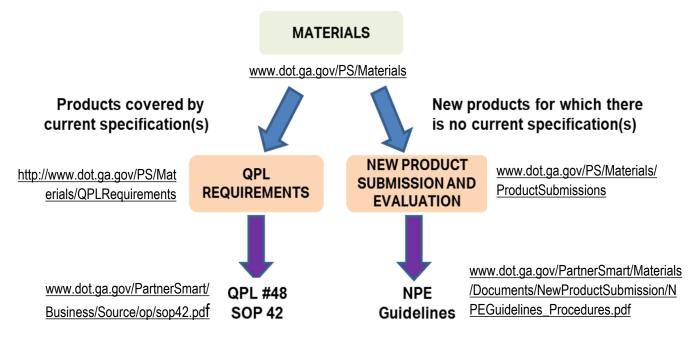


Figure 1: GDOT Product Evaluation Processes

3. Policy

Other local municipalities are encouraged to review these requirements for potential adoption by their agency. GDOT will provide technical assistance to local agencies in Georgia upon request.

The current version of this SOP is available free of charge and online at GDOT's website, as shown on Figure 1.

This SOP is subject to periodic review and revisions without notification. It is the responsibility of the Applicant to meet current requirements contained herein.

4. Definitions/Abbreviations

Applicant: Manufacturer, or vendor, applying for product qualification on the GDOT QPL 48. Responsible for representing the manufacturer's quality management system and product warranty.

Compliance Matrix: A document developed from a specification for use by GDOT and the Applicant in assessing conformance with a specification. Compliance matrices for products are available at http://www.dot.ga.gov/PS/Materials/QPLRequirements.

Corrective Action: An action taken to eliminate the cause of an existing nonconformity, defect, or other undesirable situation to prevent recurrence.

Manual on Uniform Traffic Control Devices (MUTCD): The Federal Highway Administration's (FHWA) standards used by public agencies for the installation and maintenance of traffic control signals on public streets. The MUTCD is available at https://mutcd.fhwa.dot.gov/.

Network Compatibility: Seamless communication across GDOT's ITS communication network and the ability to directly feed or exchange video or data required of that device.

OTO: Office of Traffic Operations, part of the Georgia Department of Transportation. This office is responsible for daily operations of all GDOT traffic control devices and ITS. The OTO is responsible for evaluating the products covered by this SOP and for maintaining QPL 48.

Product: A traffic control signal or device or ancillary device that complies with the FHWA MUTCD or GDOT Standard Specifications. The New Products Evaluation Committee will evaluate products or technologies that are not covered by current GDOT specifications.

Qualified Product List (QPL): A listing of qualified products that GDOT has reviewed and found compliant with specifications and authorized for use on the streets and highways of Georgia. The published information concerning the qualified product consists of the following:

- Product specification to which conformity has been qualified (first three digits in qualification number)
- Product type
- Product description/model number
- Qualification number
- Applicant name/address/web site address/phone number
- Applicant contact name/e-mail address/phone number

The list is available at http://www.dot.ga.gov/PartnerSmart/Materials/Documents/qpl48.pdf.

Quality Assurance: The act of providing fact-based evidence to verify quality products, services, and information are being delivered.

Subject Matter Experts (SME): Persons within GDOT with the highest level of familiarity and expertise with the matter at hand.

Standard Specifications: Specifications written to the bidder, prior to award of a contract, and to the contractor. Contain requirements setting out or relating to the method or manner of performing work or to the quantities and qualities of materials and labor for GDOT contracts. The specifications are also used for the evaluation and qualification of official ITS and traffic control signals and devices, and ancillary devices for use on Georgia streets and highways. Standard Specifications are available at

http://www.dot.ga.gov/PartnerSmart/Business/Source/Pages/Specifications.aspx.

Third-Party Product Testing: Testing by a party independent of GDOT and the Applicant that verifies the product conforms to applicable specifications.

Traffic Control Signals: Electrical devices placed along or above a roadway to guide, warn, and regulate the flow of traffic, which includes motor vehicles, motorcycles, bicycles, pedestrians, and other road users. Examples of electrical devices include traffic signals, ramp meters, pedestrian hybrid beacons, rectangular rapid flashing beacons, flashing beacons, and the components that allow these devices to function (cabinets/enclosures, detection systems, controllers, switch relays, power supplies, backup power, cabling, network communications media and equipment, etc.).

5. Roles

The QPL Products Evaluation Committee (Committee) reviews traffic control signal and ITS products for use within GDOT's Right-of-Way. The Committee is composed of SMEs from the OTO and other Department offices with expertise to evaluate proposed products for inclusion on QPL 48.

The Committee operates in accordance with the guidelines and procedures documented in SOP 42.

6. Procedure

The Applicant must demonstrate that their product fully meets and is compliant with the requirements specified herein. GDOT will only consider products adequately developed, screened, and tested by the Applicant and/or approved third-party testing facilities to meet current GDOT specifications.

The GDOT QPL 48 product evaluation process consists of three steps as shown on Figure 2. Submittal requirements for each step are described in this section.

GDOT QPL #48 UPDATE (GDOT Product Qualification Process)

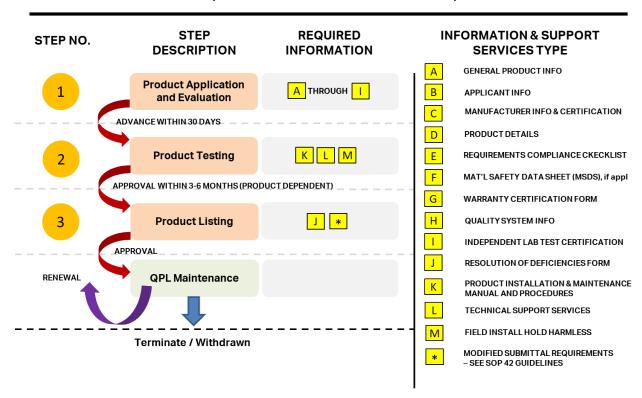


Figure 2: GDOT QPL 48 Process Diagram

A product will be listed on QPL 48 only after GDOT verifies product compliance with the current applicable specifications.

6.1 Step 1: Production Application and Evaluation

The Applicant is required to submit the following documentation to initiate the QPL application process.

6.1.1 Production Application

This step consists of an initial review of the Submittal Package described below to determine whether the proposed product is a candidate for inclusion on the QPL and that all items required for evaluation have been provided and are complete.

For each product, the Applicant shall provide a Submittal Package to GDOT for consideration and evaluation that includes the following:

 QPL 48 Product Evaluation Forms – To begin the QPL product evaluation process, complete and submit the appropriate QPL 48 Product Evaluation Form with all required documentation and information specified here: http://www.dot.ga.gov/PS/Materials/QPLRequirements

Required Information on the Form

- a. General Product Information: Include product name, model number, and part number.
- b. Applicant Information: Include contact information and title of the company representative submitting application.
- c. Manufacturer Information: Include name of manufacturer (fabricator) of the product.
- d. Product Description & Recommended Use: Include a complete description of product with recommendations for its intended use.
- e. Other State Qualified or Approved Products List Programs: Include a list of other state Department of Transportation (DOT) QPL/APL Programs where the same product is currently listed and in use, if applicable. Provide contact information for DOT representatives.
- f. List of National Standards: Include a list of primary national standards the product meets that are pertinent by the GDOT product specifications.
- g. Estimated Cost: Include Manufacturer Suggested Retail Price (MSRP) of product. If the product is comprised of multiple parts/components, present line item MSRP for each component that may be replaced as part of service or ongoing maintenance of the product.
- Product Change Documentation: Include design or fabrication changes made since the product was last listed on the GDOT QPL. Not applicable for new products or first-time applications.

Required Documentation

- a. Product Details: Include, as applicable, product cut sheets, product literature, operating manuals, test data sheets, and technical specifications.
- b. Material Safety Data Sheet (MSDS): Include, if applicable, product MSDS.
- c. Product Installation and Maintenance: Include, as applicable, assembly and installation instructions, procedures, tools and parts lists, troubleshooting and service manual, and circuit board schematics and/or block diagrams.

- d. Independent Laboratory Test Evaluations: As required, provide test reports and qualification letter from independent test laboratories affirming conformance to the National Electrical Manufacturers Association (NEMA), Ingress Protection (IP), Underwriters Laboratories (UL), and Electronic Industries Alliance (EIA) standards and applicable, current GDOT specifications. Refer to Section 6.2 for additional requirements.
- Compliance Matrices Provide completed matrices (checklists) that detail how the product or component meets or exceeds the established GDOT Standard Specifications and requirements found at
 - http://www.dot.ga.gov/PartnerSmart/Business/Source/Pages/Specifications.aspx
- 3. **Warranty Certification Form** Provide warranty letter and certify that the product meets the criteria on the form and is signed by a legal representative of the Applicant.

Electronic submission of the Submittal Package shall be in Portable Document Format (PDF) and e-mailed to QPL48@dot.ga.gov.

The Applicant should expect verification (receipt) of the Submittal Package within three calendar days.

The Applicant signing the application shall be someone authorized to fully represent the product, including the manufacturer's warranty. The Applicant shall have a supply chain support system in place at the time of application that includes sales, supply, technical support, and after-the-sale support throughout the State of Georgia.

Note: Because the Georgia state government is subject to an open records law, the OTO is not authorized to sign confidentiality or non-disclosure agreements. The public records law provides for safeguarding confidentiality of information under certain conditions. Application forms provided at {add hyperlink} contain instructions for the Applicant to review Georgia's Open Records Act (GA Code, Title 50, Chapter 18, Section 70 to 72) regarding public records and the exemptions applicable to public records requests that concern trade secrets. To the extent allowed by state law, the OTO will maintain confidentiality by its staff concerning information received and marked as a "trade secret" or "confidential" by the Applicant.

6.1.2 Product Evaluation

In this step, the product specifications and other documentation receive a desktop evaluation to verify that the product meets or exceeds applicable GDOT specifications. The number of a product's documented deployments and success of those deployments will also determine whether the product should be included in laboratory or operational field evaluation(s).

6.1.2.1 Access to Applicant Facilities

Upon request, the Applicant shall provide OTO staff or their representative unobstructed access to their facilities and those of their contract suppliers in relation to the products to be qualified.

6.1.2.2 Product Labels

A limited number of manufacturers produce whole products. Products that are assembled components from multiple sources (CCTV lens, camera body, camera sensor, circuit boards, cabling, enclosure, etc.) shall be fully warranted (all components) by the manufacturer (product assembler).

Product labels shall be unique. Applicants will not be allowed to list products other than their own. GDOT will not evaluate or list the same-labeled product on the QPL unless the product is privately labeled and warranted by a separate corporate entity or subsidiarity.

6.2 Step 2: Product Testing

Upon acceptance, the Applicant will be notified in writing to provide a product sample to the OTO for testing. In this step, the sample product is tested in a laboratory and/or field environment for verification of requirements. Submitted products shall be identified by brand name, type, part number, date of manufacture, and any other pertinent information such as installation instructions.

The Applicant should expect a written response from GDOT within 30 calendar days that the Submittal Package is complete and accepted, or additional information is needed to correct any deficiencies.

Product samples shall be provided at no cost to GDOT to the following address:

Georgia Department of Transportation
Attention: QPL Manager
935 United Avenue, Building 24

Atlanta, GA 30316

The Applicant shall provide the following:

- 1. Technical Support Services: Provide technical support during evaluation and testing of sample products including on-site support to set up and configure sample product, troubleshooting, and technical assistance.
- 2. Field Installation Certification Form: Certify and warrant the following:
 - a. If the product fails during testing, the Applicant shall remove and replace the product at no cost to GDOT.
 - b. If required by the MUTCD, the Applicant shall provide a temporary traffic control plan prior to starting any field work.
 - c. The Applicant shall indemnify and hold harmless GDOT from all liabilities, damages, losses, and costs incurred and paid to the extent caused by negligence, recklessness, or intentional wrongful misconduct of the Applicant and persons employed by the Applicant in preparation and installation of the sample product in the field.

Testing may take three to six months from the receipt of sample product.

Upon successful completion of the testing and/or field trial, the Committee will meet with internal team members to review results and determine whether to add the product to the QPL.

6.2.1 Product Testing Requirements

The minimum GDOT product test requirements are as follows:

- The Applicant is advised that the evaluation of their product is not a commitment to purchase, recommend, or specify their product, and that the data developed is public information (see note in Section 6.1.1).
- Applicants are advised that testing and evaluations may take up to six months.
- During the testing period, GDOT and associated entities responsible for the testing process will not be held liable for damage to the product and associated equipment.
- The Applicant will be updated on the status of the evaluation at 90-day intervals, when problems occur, or when a decision is made.
- The product and associated equipment shall be picked up within 60 days of notification of decision, or it will be considered abandoned and become the property of the State of Georgia.

6.2.2 Testing Criteria

Products submitted for evaluation shall meet the following test requirements:

- Verification of functional requirements and operations
- Compliance with GDOT's specifications and interoperability with the communication network equipment.
- Network compatibility with the current GDOT Advanced Traffic Management System (ATMS) platform.

6.2.3 Third-Party Laboratory Testing and Reporting Requirements

Products submitted for evaluation that require third-party testing shall meet the following testing requirements:

- The OTO maintains a list of acceptable independent testing laboratories that may be used by the Applicant. These laboratories have previously demonstrated the ability to test for various nationally accepted standards referenced in GDOT's specifications. The list of independent testing laboratories is provided in Appendix B.
- While the list is provided for the benefit of applicants, a laboratory not included in the list may be selected.
- The independent testing laboratory and its personnel shall not in any way be associated with the Applicant, or any parent or subsidiary of same.
- The Applicant is responsible for verifying that the independent testing laboratory and test report meet all requirements and applicable product specifications.
- Test equipment and reports shall meet the following requirements:

- Test equipment required for product testing by the Applicant shall be independently calibrated. The test equipment calibration range will include test measurements recorded in the laboratory report.
- The laboratory report shall be organized based on each subsection of the testing standard.
- The laboratory report shall contain the following, at a minimum:
 - Laboratory name, address, phone number, and web site address
 - Names and titles of staff performing the test
 - Executive summary of the test results indicating passed (i.e., met product specifications) or failed
 - Description of the test procedure and date of testing
 - Description of the test equipment used and certificate of calibration current at the time of testing
 - Test conditions
 - · Product specifications used for testing
 - Test results, including a pass/fail status relative to each test performed and supporting test data (graphs, measured data, etc.)
 - Product description, part/model number, and date of manufacture of product
 - Photographs of the product taken before, during, and after the testing

6.2.4 Product Retention

The qualified product sample will become the property of GDOT. Some products, due to size and practicality, may be deemed unnecessary to retain and will be returned to the Applicant.

If the product sample submitted for qualification does not meet the current specifications, the Applicant will have 60 calendar days to retrieve the sample. After such time, the OTO reserves the right to dispose of the unclaimed sample(s).

Product samples used for field testing and GDOT evaluation shall remain the property of the Applicant. GDOT assumes no liability for damage or loss during the field-testing period. Upon successful completion of the field test, GDOT shall have the option to purchase the products in place or have the Applicant remove them at no cost to the Department.

6.3 Step 3: Product Listing

Upon successful acceptance of the product evaluation and completion of Steps 1 and 2, the Committee will notify the Applicant of GDOT's decision and effective date in writing.

7. QPL Maintenance

Products on QPL 48 are subject to periodic review for design changes and updates to technology. Conditions for maintaining, suspending, and withdrawing qualification are included in this section.

The Applicant is expected to conduct regular product testing and maintain product control records to verify specification compliance.

The Applicant shall notify the OTO with a letter to QPL48@dot.ga.gov when the following events occur:

- When changes occur to the product design, product features, software/firmware updates, or material composition of QPL products.
- When changes occur to company name, manufacturing location, part number, or product name.

Failure to provide this notification letter will result in removal from the QPL until re-evaluation can be performed.

The Applicant's letter shall state the following:

- The event will result in no change to the product quality, reliability, or specification compliance.
- The event will result in no change to design or material or manufacturing process.
- All existing warranties will continue to be honored.

8. Renewal

Products covered in this SOP shall be re-evaluated when significant hardware or firmware upgrades are made, and at prescribed intervals. The OTO also reserves the right to re-evaluate a product at their discretion, at any time.

The OTO may require the Applicant to requalify the product for any of the following reasons:

- To verify that obsolete products are not kept on the list, the OTO may request written confirmation from the Applicant that the product is still available and has not changed design specifications. Failure to respond to the OTO written request within 14 calendar days will result in the product being removed from the QPL.
- As GDOT updates the standard specifications, the OTO will re-evaluate all QPL 48 products associated with that change.
- GDOT regularly revises specifications to incorporate new technologies, remove legacy items no longer desired, and improve standards. As GDOT's material specifications or functional requirements change, the OTO may require requalification to verify that the product meets the new specifications.
 - If the latest product specification revisions are deemed more stringent than earlier versions, the OTO will notify the Applicant of affected products and specific revisions. A reasonable amount of time will be established, depending upon the extent of revisions, to allow applicants to implement any necessary product changes.
 - The Applicant shall submit a completed product compliance matrix corresponding to the revised specification. Upon review of the matrix, additional information (documentation and/or a product sample representative of the line or group of products to be requalified) may be required of the Applicant.
 - The product will remain listed on the QPL if it is deemed to meet revised specification(s).
 In this case, a new qualification letter will not be issued. If not, the product will continue

to be listed on the QPL with a disclaimer that it can no longer be used after the effective date of the revised specification (reduction of qualification).

 GDOT may require requalification of QPL listed products to verify compatibility with upgrades to the existing or transitioning ATMS platform.

9. Termination/Withdrawal

Removal from QPL 48 will prohibit the use of the product on GDOT projects and infrastructure until the product has been resubmitted for evaluation and again receives approval.

The Committee will assign a responsible GDOT representative (individual or group) to monitor products covered by this SOP. The Applicant shall provide the GDOT representative with all traffic signal and ITS item updates or changes on an as-needed basis.

OTO representatives may elect to perform unscheduled visits to the manufacturing facility, warehouse, and/or construction or maintenance projects to view, inspect, and/or test items on QPL 48.

The OTO reserves the right to remove or suspend a product from the QPL because of specification or quality issues identified during these reviews, including, but not limited to:

- Product performance significantly varies from those established by the Applicant as verified by the OTO.
- Failure to notify GDOT in writing of any modification, alteration, or obsolete nature of listed product(s).
- Products that meet the current specifications, but do not perform satisfactorily in the field.
- Products that meet current specifications but were not submitted for scheduled reevaluation.
- An Applicant is acquired by another company. GDOT may require re-evaluation of any or all products. The same applies if the Applicant goes out of business and its inventory is acquired by another company.
- Failure to address the following deficiencies:
 - Applicant performance (i.e., technical support/customer service, ATMS compatibility)
 - Applicant quality assurance
 - Manufacturer production fabrication capabilities and procedures

Depending on the severity of the alleged deficiency or lack of corrective action by the Applicant, GDOT may suspend qualification until the alleged deficiency or issue is resolved.

Certification may be withdrawn at the request of the Applicant.

Upon disqualification, termination, suspension, or withdrawal of qualification, the Applicant shall discontinue use of all product advertising identifying GDOT as a customer.

The Applicant shall discontinue the sale of all products involved in the disqualification, termination, suspension, or withdrawal from the QPL on all active GDOT projects.

Appendix A PRODUCTS REQUIRING QPL LISTING

This appendix lists ITS and traffic control signal components that require listing on the QPL. Products are organized based on GDOT standard specification number and name. This list is not intended to be all-inclusive (only known products are listed).

Table 1: ITS and Traffic Control Signal Components on the QPL

2070 Assemblies/Subassemblies	Equipment Cabinets
Uninterruptable Power Service	Flashing Beacon Assemblies and Accessories
Cabinet Components (various modules)	Mounting Hardware
Dynamic Message Signs	Network Electronics
Closed Circuit Television	Pedestrian Signal Equipment
Detection and Detection Accessories	Vehicle Signal Heads and Accessories

Appendix B LIST OF THIRD-PARTY TESTING FACILITIES

This appendix lists potential third-party testing laboratories._This is not intended to be an all-inclusive listing of qualified facilities for product testing services or list of exclusive facilities from which GDOT will only accept results.

Table 2: List of Third-Party Testing Laboratories

Name	Address	Phone	Test
A2Z Test Lab	220 Power Court; Sanford,	(407) 323-3390	NEMA TS2
	FL 32771		(Environmental; 2.27, 2.2.8
			and 2.2.9)
Applied Testing &	401 E. Fourth Street, Bldg	(800) 277-6400	ANSI/SCTE 77 (Structural
Geosciences	12-B; Bridgeport, PA 19405		Load Rating)
Athens Technical	8157 US Highway 50;	(740) 592-2874	NEMA TS2 (SDLC
Specialists, Inc.	Athens, OH 45701		Communications)
(ATSI)			
CALCOAST -	4072 Watts St; Emeryville,	(510) 652-2488	SAE J595, Class 1
International Testing	CA 94608		(Photometric)
Laboratory			
Cascade Technical	5245-A NE Elam Young	(503) 648-1818	NEMA TS2
Sciences	Parkway; Hillsboro, OR		(Environmental; 2.27, 2.2.8
	97124	(and 2.2.9)
Centre de	1201 Cremazie Blvd. East,	(800) 667-4570	NEMA TS4 (DC
Recherche	Suite 1.201; Montreal,		Environmental)
Industrielle Quebec	Quebec H2M 0A6; Canada		
(CRIQ)	N 40 1 0 1 1	000 0 0000 000	NEMA TOO
Cerpass Technology	No. 10, Lane 2, Lianfu	886-3-3226-888	NEMA TS2
Corp.	Street, Luzhu Area; Taoyuan		(Environmental; 2.27, 2.2.8 and 2.2.9)
Compatible	City; Taiwan 114 Olinda Drive; Brea, CA	(714) 579-0500	FCC 47 CFR Part 15,
Electronics, Inc.	92823	(714) 579-0500	Subpart B (Emissions)
CRT Laboratories,	1680 North Main Street;	(714) 283-2032	ANSI/SCTE 77 (Structural
Inc.	Orange, CA 92867	(714) 203-2032	Load Test)
DATASYST	S14 W33511 Highway 18;	(262) 968-4003	NEMA TS4
Engineering &	Delafield, WI 53018	(202) 300-4003	(Environmental)
Testing Services,	Dolancia, VVI 00010		(Environmental)
Inc.			
Dayton T. Brown,	1175 Church Street;	(800) 837-8456	ANSI/SCTE 77 (Structural
Inc.	Bohemia, NY 11716		Load Rating); NEMA TS2
	,		(Environmental)
Dynamic	1300 Space Park Way;	(650) 967-6982	ANSI/SCTE 77
Consultants, Inc.	Mountain View, CA 94043		(Environmental)
Environ	9725 Girard Avenue South;	(800) 826-3710	NEMA TS4
Laboratories LLC	Minneapolis, MN 55431		(Environmental)
Environmental	9604 Variel Avenue;	(818) 709-0568	NEMA TS2
Associates, Inc.	Chatsworth, CA 91311		(Environmental; 2.27, 2.2.8
			and 2.2.9)

Name	Address	Phone	Test
Fenestration Testing	8148 NW 74th Avenue;	(305) 885-3328	NEMA TS2
Laboratory, Inc.	Medley, FL 33166		(Environmental); 120/150
			mph Wind Tunnel Test
			(Aerodynamic Structural)
International	1057 Tullar Court; Neenah,	(920) 720-5555	FCC 47 CFR Part 15 Class
Compliance	WI 54956		A (Emissions)
Laboratories	No. 5 O Lin 4 Tin Fu Tour	+886-2-260-6861	NEMA TS2
Interocean EMC Technology Corp.	No. 5-2 Lin 1 Tin-Fu Tsun Lin-Kou Hsiang, Taipei	+880-2-200-0801	(Environmental; 2.27, 2.2.8
reciniology corp.	County 244, Taiwan, R.O.C.		and 2.2.9)
Intertek	7250 Hudson Blvd., Suite	(651) 730-1188	ITE, Vehicle Traffic Control
Interter	100; Oakdale, MN 55128	(001) 700-1100	Signal Heads: Light
			Emitting Diode Vehicle
			Arrow Traffic Signal
			Supplement
			(Environmental,
			Photometric, Colorimetric
			and Electrical)
Intertek	70 Codman Hill Road;	(978) 263-2662	NEMA TS2
	Boxborough, MA 01719		(Environmental; 2.27, 2.2.8
L t t L ETLOCAUCO	2000110 D + 44 0 11 1	(007) 750 0744	and 2.2.9)
Intertek ETLSEMKO Div.	3933 US Route 11; Cortland, NY 13045	(607) 753-6711	ITE, Vehicle Traffic Control
DIV.	111 13045		Signal Heads: Light Emitting Diode Vehicle
			Arrow Traffic Signal
			Supplement
			(Environmental,
			Photometric, Colorimetric
			and Electrical)
Intertek Testing	13200 Levan Road; Livonia,	(734) 591-9161	NEMA TS2
Services NA, Inc.	MI 48150		(Environmental; 2.27, 2.2.8
			and 2.2.9)
K-Light Laboratories	15705 Arrow Highway, Suite	(626) 960-0400	ITE and NEMA TS4
Corp.	3; Irwindale, CA 91706	(604) 047 0444	(Photometric)
LabTest Certification, Inc.	3133-20800 Westminster Hwy; Richmond, B.C. V6V	(604) 247-0444	NEMA 250; FCC 47 CFR Part 15, Subpart B
Certification, inc.	2W3; Canada		(Emissions)
MET Laboratories,	914 West Patapsco Avenue;	(410) 354-3330	NEMA TS1
Inc.	Baltimore, MD 21230	(.10) 55 + 5555	(Environmental)
National Technical	36 Gilbert Street South;	(732) 936-0800	NEMA TS2
Systems	Tinton Falls, NJ 07701	, ,	(Environmental; 2.27, 2.2.8
-			and 2.2.9)
National Technical	1146 Massachusetts	(978) 266-1001	NEMA TS2
Systems	Avenue; Boxborough, MA		(Environmental; 2.27, 2.2.8
	01719		and 2.2.9)

Name	Address	Phone	Test
National Technical	1536 East Valencia Drive;	(714) 879-6110	NEMA TS2
Systems	Fullerton, CA 92831		(Environmental; 2.27, 2.2.8 and 2.2.9)
Northwest EMC	22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124	(888) 364-2378	FCC 47 CFR Part 15 Class A (Emissions)
Penn State University - Aerospace Engineering Dept	229 Hammond Building; University Park, PA 16802	(814) 865-2569	120/150 mph Wind Tunnel Test (Aerodynamic Structural)
Powertech Labs, Inc.	12388 88th Ave.; Surrey, B.C. V3W 7R7; Canada	(604) 590-7500	NEMA TS2 (Shock and Vibration Tests)
Precision Test Solutions	6120 Hanging Moss Road; Orlando, FL 32807	(407) 678-6900	NEMA TS2 (Environmental; 2.27, 2.2.8 and 2.2.9)
Product Safety Engineering, Inc.	12955 Bellamy Brothers Blvd; Dade City, FL 33525	(352) 588-2209	FCC 47 CFR Part 15, Subpart B (Emissions)
Professional Testing (EMI), Inc.	1601 North A.W. Grimes Blvd., Suite B; Round Rock, TX 78665	(512) 244-3371	NEMA TS2 (Environmental; 2.27, 2.2.8 and 2.2.9)
QAI Laboratories	8385 White Oak Avenue; Rancho Cucamonga, CA 91730	(929) 483-0250	ANSI/SCTE 77 (Structural Load Rating)
S&ME, Inc.	1413 Topside Road; Louisville, TN 37777	(865) 970-0003	ANSI/SCTE 77 (Environmental)
San Diego Air and Space Technology, Low Speed Wind Tunnel	3050 Pacific Highway; San Diego, CA 92101	(619) 683-8900	120/150 mph Wind Tunnel Test (Aerodynamic Structural)
Stanford Technology Corp.	57 Poplar St., Research Park; PO Box 2100-D; Glenbrook, CT 06906	(203) 348-4080	NEMA TS2 (Environmental; 2.27, 2.2.8 and 2.2.9)
Tarang Lab - Wipro Technologies	Survery # 70, 77, 78/8A Doddakanelli, Sarjapur Road; Bangalore, 560035; India	91-80-30292929	NEMA TS2 (Environmental; 2.27, 2.2.8 and 2.2.9)
Tektronix, Inc.	1133 State Rt. 23; Wayne, NJ 07876	(973) 628-1363	NEMA TS-2 and TS-4 (Environmental)
The Specialty Lab, Inc.	1454 West County Road C; Roseville, MN 55113	(651) 482-2778	NEMA TS2 (Environmental; 2.27, 2.2.8 and 2.2.9)
TÜV SÜD America Inc.	1775 Old Highway 8 NW, Suite 104; New Brighton, MN 55112	(651) 631-2487	NEMA TS2 (Environmental; 2.27, 2.2.8 and 2.2.9)

Name	Address	Phone	Test
Underwriters	1285 Walt Whitman Rd;	(631) 271-6200	UL 1449 (Surge Protective
Laboratories, Inc.	Melville, NY 11747		Devices); UL 1283
			(Electromagnetic
			Interference Filters)
Underwriters	12 Laboratory Drive; P.O.	(919) 549-1400	UL 1449 (Surge Protective
Laboratories, Inc.	Box 13995; Research		Devices)
	Triangle Park, NC 27709		
Washington	7560 Lindbergh Drive;	(301) 216-1500	FCC 47 CFR Part 15 Class
Laboratories, Ltd	Gaithersburg, MD 20879		A (Emissions); NEMA TS2
			(Environmental) (test also
			conducted on DC powered
			devices)